

**Before the  
Federal Communications Commission  
Washington, D.C. 20554**

In the Matter of	)	
	)	
State of Connecticut	)	WT Docket No. 02-55
and Sprint Nextel Corporation, Inc.	)	
	)	
Mediation No. TAM-12119	)	

**MEMORANDUM OPINION AND ORDER**

**Adopted: August 19, 2010****Released: August 19, 2010**

By the Deputy Chief, Policy Division, Public Safety and Homeland Security Bureau:

**I. INTRODUCTION**

1. In this *Memorandum Opinion and Order* we address a case referred to us for *de novo* review from Wave 1, Phase 2 mediation by the 800 MHz Transition Administrator (TA) involving a dispute between the State of Connecticut (Connecticut) and Sprint Nextel Corporation, Inc. (Sprint) (collectively, the Parties).<sup>1</sup> The issues disputed in this case concern the use of hybrid combiners vs. autotune combiners in Connecticut's mutual aid system, and various costs for legal and licensing services and system documentation.

2. Based on our review of the mediation record, the Recommended Resolution submitted by the TA-appointed mediator in this case, and the parties' Position Statements, we find that Sprint has taken the steps necessary to protect Connecticut from interruption of service during the transition to rebanded frequencies by offering to supply it with hybrid combiners for a back-to-back repeater system, provided Sprint develops a proposal for inclusion of an outboard bandpass filter at any site where intermodulation interference is encountered. We also find that Connecticut has met its burden of proof in regard to the time it proposes for system testing, legal fees and licensing services. We find, however, that Connecticut has failed to justify the hours it requests for site documentation.

**II. BACKGROUND**

3. The *800 MHz R&O* and subsequent orders in this docket require Sprint to negotiate an FRA with each 800 MHz licensee that is subject to rebanding.<sup>2</sup> The FRA must provide for retuning of the licensee's system to its new channel assignments at Sprint's expense, including the expense of retuning or replacing the licensee's radio units as required.<sup>3</sup> Sprint must provide the rebanding licensee with "comparable facilities" on the new channel(s), and must provide for a seamless transition to enable

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<sup>1</sup> Recommended Resolution, TAM-12119 at 1 (filed Dec 14, 2009) (TA RR).

<sup>2</sup> See *Improving Public Safety Communications in the 800 MHz Band, Report and Order, Fifth Report and Order, Fourth Memorandum Opinion and Order*, 19 FCC Rcd 14969, 15021-45, 15069 ¶¶ 88-141, 189 (2004) (*800 MHz Report and Order*); *Improving Public Safety Communications in the 800 MHz Band, Supplemental Order and Order on Reconsideration*, 19 FCC Rcd 25120 (2004) (*800 MHz Supplemental Order*); *Improving Public Safety Communications in the 800 MHz Band, Memorandum Opinion and Order*, 20 FCC Rcd 16015 (2005).

<sup>3</sup> *800 MHz Report and Order*, 19 FCC Rcd at 14977 ¶ 11.

licensee operations to continue without interruption during the retuning process.<sup>4</sup> If the parties cannot reach agreement on a FRA, the case is referred to mediation, and issues that cannot be resolved in mediation are, in turn, referred to the Public Safety and Homeland Security Bureau (PSHSB) for *de novo* review.<sup>5</sup> The Parties have been unable to resolve certain issues during the negotiation of an FRA relating to the types of combiners to be installed in a back-to-back repeater system which will allow operation on both the old and new mutual aid NPSPAC channels during the rebanding process.<sup>6</sup> In addition, the Parties were unable to resolve four additional issues relating to system testing, site documentation, legal costs and licensing costs.<sup>7</sup>

4. Because the Parties were unable to resolve outstanding issues during the negotiation period, which ended on October 31, 2006, they were entered into mediation.<sup>8</sup> The mediation period was extended several times but—as indicated above—the Parties were ultimately unable to resolve all outstanding issues.<sup>9</sup> Consequently, the TA Mediator ordered the Parties to file Proposed Resolution Memoranda (PRMs).<sup>10</sup> The pleading cycle ended on December 4, 2009 and the TA Mediator submitted its Recommended Resolution on December 14, 2009.<sup>11</sup> The Parties submitted Statements of Position in response to the Recommended Resolution on December 29, 2009.<sup>12</sup>

### III. DISCUSSION

#### A. Standard of Review

5. The Commission's orders in this docket assign Connecticut the burden of proving that the funding it has requested is reasonable, prudent, and the "minimum necessary to provide facilities comparable to those presently in use" (Minimum Cost Standard).<sup>13</sup> The Commission subsequently clarified that the term "minimum necessary cost" does not mean the absolute lowest cost under any circumstances, but the "minimum cost necessary to accomplish rebanding in a reasonable, prudent, and timely manner."<sup>14</sup> The Minimum Cost Standard thus takes into account not only cost, but all of the objectives of the proceeding, including completing the rebanding process in a timely and efficient manner,

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<sup>4</sup> *Id.* at 14986 ¶ 26.

<sup>5</sup> *Id.* at 15077 ¶ 201.

<sup>6</sup> TA RR at 4.

<sup>7</sup> *Id.* at 4-5.

<sup>8</sup> *Id.* at 2.

<sup>9</sup> *Id.* at 3.

<sup>10</sup> See Proposed Resolution Memorandum of Nextel Communication, Inc., TAM-12119 (filed November 3, 2009) (Sprint PRM); Proposed Memorandum and Position of the State of Connecticut, TAM-12119 (filed November 13, 2009) (Connecticut PRM); Reply of Nextel Communications, Inc. to the Proposed Resolution Memorandum of the State of Connecticut, TAM 12119 (filed November 30, 2009) (Sprint Reply).

<sup>11</sup> See *supra* n. 1.

<sup>12</sup> See Statement of Position of Sprint Nextel Communications, Inc., TAM-12119 (filed December 29, 2009) (Sprint SOP); Request for De Novo Review and Statement of Position of the State of Connecticut (filed December 29, 2009) (Connecticut SOP).

<sup>13</sup> 800 MHz Report and Order, 19 FCC Rcd at 15074 ¶ 198; 800 MHz Supplemental Order, 19 FCC Rcd at 25152 ¶ 71.

<sup>14</sup> Improving Public Safety Communications in the 800 MHz Band, WT Docket 02-55, Memorandum Opinion and Order, 22 FCC Rcd 9818, 9820 ¶ 6 (2007) (*Rebanding Cost Clarification Order*).

minimizing the burden that rebanding imposes on public safety licensees, and facilitating a seamless transition that preserves public safety's ability to operate during the transition.<sup>15</sup>

6. In addition to the Minimum Cost Standard, our review of the Parties' positions is informed by the TA Metrics, which are derived from the rebanding costs of licensees that have reached FRAs with Sprint.<sup>16</sup> At this stage in the rebanding program, the TA Metrics are accorded substantial, although not dispositive, weight in the assessment of rebanding cost proposals. The current metrics reflect data derived from over 800 executed Stage 2 FRAs involving public safety systems.<sup>17</sup> Accordingly, the TA Metrics are proving to be an increasingly reliable index of the reasonableness of the costs claimed by the parties.<sup>18</sup> Therefore, the further proposed costs for services and equipment deviate from the TA Metrics, the higher a party's burden to justify those costs with record evidence.

### **B. Issues in Dispute**

7. Connecticut operates a complex 800 MHz network which serves the entire State of Connecticut.<sup>19</sup> The network consists of three major components: a trunked voice network providing communications services to the State Police, a data network providing officers and field personnel with access to law enforcement and emergency services databases and a mutual aid network providing access to the ITAC and ICALL mutual aid channels throughout the state.<sup>20</sup> The Parties have agreed to terms for reconfiguring the first two components of the system. Thus, the instant dispute concerns reconfiguration of the mutual aid system.<sup>21</sup>

8. The overall cost of rebanding as proposed by Connecticut is \$5,381,638 an amount which places it in the 96<sup>th</sup> percentile for systems of comparable size.<sup>22</sup> Sprint's counteroffer is \$5,206,523 which is in the 94<sup>th</sup> percentile.<sup>23</sup> The parties thus are \$175,115 apart. These costs, however, are not the only dispute between the parties – they also disagree on the kinds of equipment that Sprint must provide to Connecticut to maintain interoperability during rebanding.<sup>24</sup>

<sup>15</sup> *Id.* at 9820 ¶¶ 6, 8.

<sup>16</sup> The TA has made the Metrics available on its website.  
[http://www.800ta.org/content/resources/FRA\\_Statistics.pdf](http://www.800ta.org/content/resources/FRA_Statistics.pdf) (TA Metrics).

<sup>17</sup> More specifically, the cost metrics for the case at hand derive from an analysis of 62 executed Stage 2 Public Safety FRAs for systems having between 4001-10,000 subscriber units. TA Metrics at Table 2.

<sup>18</sup> We note that, as of December 28, 2009, the TA had seen 92 percent of the Stage 2 non-border FRAs. *See* 800 MHz Transition Administrator, LLC Quarterly Progress Report for the Quarter Ended September 30, 2009 at 5. Available at <http://www.800ta.org/content/reporting/quarterlyreports.asp>

<sup>19</sup> TA RR at 3. The call signs involved in this reconfiguration are: WNSM668, WNSM669, WNSM670, WNSM671, WNSM672, WNSM673, WNSM674, WNSM675, WNSM676, WNSM677, WNSM678, WNSM679, WNSM680, WNSM681, WNSM682, WPGU367, WPGU368, WPGU369, WPGU370, WPGU371, WPGU372, WPGU373, WPGU374, WPGU375, WPHC501, WPPF755, WPQD716, WPRI286, WPRI287, WPRI288, WPRI289, WPRI290, WPRI291, WPRI534, WPRI536, WPRI618, WPSL713, WPTB204 and WPPA729. *Id.* at n.1.

<sup>20</sup> TA RR at 4-5. There are five mutual aid channels in the 800 MHz band. Their pre-rebanding frequencies are as follows: ICALL (821.0125 MHz / 866.0125 MHz), ITAC1 (821.5125 MHz / 866.5125 MHz), ITAC2 (822.0125 MHz / 867.0125 MHz), ITAC3 (822.5125 MHz / 867.5125 MHz) and ITAC4 (823.0125 MHz / 868.0125 MHz). After rebanding, these mutual aid channels will be located fifteen megahertz lower in frequency. *See* 47 C.F.R. § 90.617(a)(1).

<sup>21</sup> TA RR at 4.

<sup>22</sup> *Id.* at 5. Connecticut's system consists of 5,388 subscriber units. *Id.* at n.51.

<sup>23</sup> *Id.* at 5.

<sup>24</sup> *Id.*

## 1. Hybrid vs. Autotune Combiners

9. Connecticut's mutual aid network consists of one "Enhanced ICALL" channel and four ITAC channels.<sup>25</sup> Each of the thirty-nine mutual aid base stations throughout the state has one simulcast repeater programmed with the "Enhanced ICALL" channel and another, frequency-agile, repeater programmed with the four ITAC channels.<sup>26</sup>

10. In order to ensure backward compatibility of the mutual aid system during rebanding, the Parties have agreed to the installation of a back-to-back repeater system.<sup>27</sup> Backward comparability is achieved by installing, at each of the thirty-nine mutual aid sites, two additional repeaters, a combiner and an additional antenna.<sup>28</sup> The additional repeaters, loaned by Sprint, are programmed on the new ICALL and ITAC channels. Connecticut's existing repeaters remain on the old ICALL and ITAC channels.<sup>29</sup> The audio path of the Sprint loaner repeaters is linked to the original repeaters enabling simultaneous use of both the old and new mutual aid channels during the retuning of Connecticut's system.<sup>30</sup> Thus, users with the old mutual aid channels still programmed in their radio units will be able to communicate during the transition with users operating on the new mutual aid channels. The back-to-back repeater system is temporary and will be dismantled when rebanding of Connecticut's system is complete.<sup>31</sup>

11. The major issue in dispute concerns the type of combiner Sprint must loan to Connecticut during the reconfiguration process to combine the transmissions from the temporary repeaters into a single antenna.<sup>32</sup> Connecticut proposes that Sprint loan it "autotune" combiners similar to the combiners used by Connecticut in its existing mutual aid system. Conversely, Sprint offers to loan Connecticut "hybrid" combiners which it states will adequately serve the needs of the back-to-back system.

12. Hybrid combiners are relatively simple wideband<sup>33</sup> passive devices which pass whatever signals they receive, within their passband, to the transmitting antenna.<sup>34</sup> Autotune combiners, however, are significantly more complex. They pass to the antenna only the discrete frequency to which they are tuned and include circuitry which continuously monitors and adjusts combiner tuning to accommodate changes in carrier frequency and environmental conditions. Their circuitry can be configured to notify an operator if there is a fluctuation in their power output.<sup>35</sup> Hybrid combiners, although less expensive than autotune combiners, are less efficient, and their insertion loss increases as a function of the number of transmitters being combined.<sup>36</sup> Sprint estimates that deploying hybrid combiners in the back-to-back

<sup>25</sup> *Id.* at 9. Connecticut refers to the ICALL channel as "enhanced" because it is simulcast throughout the entire state. See Connecticut PRM at 9-10.

<sup>26</sup> *Id.* The four ITAC frequencies at each site originate from a single frequency-agile repeater, *i.e.*, all four ITAC frequencies are not available simultaneously.

<sup>27</sup> TA RR at 4.

<sup>28</sup> *Id.* at 9-10.

<sup>29</sup> Sprint PRM at 7.

<sup>30</sup> *Id.* See also TA RR at 10.

<sup>31</sup> TA RR at 4.

<sup>32</sup> *Id.* A combiner, as the name implies, feeds multiple transmitters into a single antenna. See *800 MHz Report and Order*, Appendix D, 19 FCC Rcd 15203 at ¶ 6.

<sup>33</sup> Hybrid combiners of the type referenced here are "wideband" to the extent they are usable across the entire 800 MHz band and are not, as are cavity combiners, tuned to a particular frequency.

<sup>34</sup> TA RR at 10.

<sup>35</sup> *Id.*

<sup>36</sup> *Id.*

repeater system will cost about one-eighth the cost of deploying autotune combiners – saving approximately \$500,000.<sup>37</sup>

13. *Sprint Position.* Sprint argues that the hybrid combiners it has offered to loan Connecticut are comparable to Connecticut’s autotune combiners in every relevant aspect and will provide Connecticut with minimal disruption during rebanding.<sup>38</sup> Specifically, Sprint contends that during mediation it attempted to address each of Connecticut’s concerns about the power loss, power rating and isolation provided by hybrid combiners.<sup>39</sup>

14. In response to Connecticut’s concern over power loss, Sprint demonstrates that the hybrid combiners it proposes to lend Connecticut would result in a power loss on the order of 0.2 to 1.1 dB relative to the autotune combiners.<sup>40</sup> Sprint avers that, even under the worse case scenario, the loss of 1.1 dB of power delivered to the antenna is insignificant and would be difficult to detect in the field.<sup>41</sup>

15. Sprint also responds to Connecticut’s concern over the power handling capability of the hybrid combiner. Although Sprint originally offered to loan Connecticut an older combiner model rated for 75 watts—which would be inadequate for the 100 watt repeaters used in the back-to-back system—Sprint later revised its offer to include a new hybrid combiner rated for 100 watts.<sup>42</sup>

16. At Connecticut’s request, Sprint conducted tests to confirm that the hybrid combiner it has offered to loan Connecticut provides 90 dB of isolation between input ports (transmitter to transmitter) and 65 dB of isolation between output and input ports (antenna to transmitter).<sup>43</sup> Sprint notes that these values are significantly better than the 70 dB (transmitter to transmitter) and 60 dB (antenna to transmitter) isolation provided by the autotune combiners currently used by Connecticut.<sup>44</sup>

17. Sprint characterizes Connecticut’s concerns about the interference risk from intermodulation or sideband noise when hybrid combiners are used as “vague and unsupported.”<sup>45</sup> According to Sprint, there is “no obvious reason” why the type of combiner used in Connecticut’s mutual aid system would result in intermodulation interference.<sup>46</sup> It points out that, since intermodulation interference is a function of the frequencies deployed, the potential for intermodulation interference in the back-to-back installation is independent of the type of combiner used.<sup>47</sup> Sprint also notes that it has agreed to space the temporary antennas for the back-to-back installation 20 feet lower on the tower than Connecticut’s existing antennas in order to minimize the chance of intermodulation interference.<sup>48</sup> Consequently, Sprint concludes that Connecticut has made a “series of illogical and unsupported technical assertions” regarding the intermodulation interference potential when hybrid combiners are used.<sup>49</sup>

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<sup>37</sup> *Id.*

<sup>38</sup> Sprint PRM at 7-8.

<sup>39</sup> *Id.* at 8.

<sup>40</sup> *Id.* at 8-10.

<sup>41</sup> *Id.* at 10; Sprint Reply at 6-7.

<sup>42</sup> TA RR at 11-12. *See also* Sprint PRM at 11-12 and Appendix 2.

<sup>43</sup> Sprint PRM at 12-13.

<sup>44</sup> *Id.*; Sprint Reply at 9.

<sup>45</sup> Sprint SOP at 7.

<sup>46</sup> *Id.*

<sup>47</sup> *Id.* at 7-8.

<sup>48</sup> *Id.* at 8; Sprint Reply at 13.

<sup>49</sup> Sprint Reply, Summary at ii.

18. *Connecticut's Position.* Connecticut states that its mutual aid systems must coexist with other 800 MHz operations, both public safety and commercial, which are co-located or in close proximity to its repeater sites.<sup>50</sup> In particular, Connecticut notes that, when its facilities are co-located, or nearby, the frequency-agile equipment deployed by Sprint and Verizon, the risk of intermodulation interference increases and creates a challenging environment for maintaining system reliability.<sup>51</sup> Connecticut states that it selects equipment for its mutual aid system based on that equipment's ability to reduce interference,<sup>52</sup> and that autotune combiners are "the armor ensuring the coverage Connecticut law enforcement and emergency services rely on."<sup>53</sup>

19. Connecticut asserts that the advantage of the autotune combiner is that it selectively passes only the signals of the mutual aid frequencies thereby deterring the mixture of signals that causes intermodulation interference.<sup>54</sup> Connecticut claims that the autotune combiners will filter out any signals from co-located Sprint or Verizon frequency-agile transmitters, thereby ensuring that Connecticut's system produces no intermodulation products that threaten its or any other repeaters at the site.<sup>55</sup> In addition, Connecticut notes that the autotune combiner's ability to constantly evaluate power levels and accommodate changes in the carrier frequency allows Connecticut to manage its network and take remedial action when necessary.<sup>56</sup>

20. Connecticut opposes hybrid combiners for the back-to-back repeater system because hybrid combiners are not frequency selective.<sup>57</sup> It argues that the hybrid combiners will allow the signals from collocated transmitters to enter the repeater, thereby attenuating the mutual aid frequencies and producing intermodulation products which can be re-transmitted by the repeater's antenna.<sup>58</sup> According to Connecticut, "hybrid combiners are notorious for generating intermodulation products without a post filter."<sup>59</sup>

21. Connecticut also expresses concern about the power rating of the hybrid combiner Sprint proposes to loan for the back-to-back system.<sup>60</sup> It notes that it objected to the original units offered by Sprint because they were rated for only 75 watts of power whereas the back-to-back repeaters will operate at 100 watts.<sup>61</sup> Although Sprint has offered a successor unit rated at 100 watts, Connecticut contends that the manufacturer was unable to explain what improvements were made to the unit to warrant the higher rating.<sup>62</sup>

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<sup>50</sup> *Id.*

<sup>51</sup> *Id.* at 11-12, Attachment I at ¶ 8.

<sup>52</sup> *Id.* at 10.

<sup>53</sup> *Id.* at 12.

<sup>54</sup> *Id.* at 16. *See also* Connecticut SOP at 7.

<sup>55</sup> Connecticut PRM at 16.

<sup>56</sup> *Id.* at 16, Attachment I at ¶ 19. *See also* Connecticut SOP at 7.

<sup>57</sup> Connecticut PRM at 16.

<sup>58</sup> *Id.* at 16, Attachment I at ¶ 17.

<sup>59</sup> *Id.* Connecticut does not explain how a hybrid combiner, a passive device, can "generate intermodulation products."

<sup>60</sup> Connecticut PRM at 18-19.

<sup>61</sup> *Id.* at 19.

<sup>62</sup> *Id.*

22. Finally, Connecticut faults Sprint for not testing the insertion loss of the hybrid combiner over the entire 800 MHz band to demonstrate its performance in a high RF environment.<sup>63</sup> Connecticut states that sound engineering practice for a public safety network requires substantiation of how equipment will perform in reality.<sup>64</sup> It states that—in its opinion—substituting the hybrid combiner for the autotune combiner will jeopardize its public safety communications.<sup>65</sup>

23. *TA Mediator.* The TA mediator believes Sprint has met its burden of proof to demonstrate that the hybrid combiners will protect Connecticut's communications from disruption during the transition.<sup>66</sup> The TA Mediator states that Sprint has shown through the power budget it prepared, the isolation tests it performed and the manufacturer's specifications it provided, that the hybrid combiner is capable of operating adequately in the back-to-back system.<sup>67</sup> The TA Mediator finds "unpersuasive" Connecticut's concern regarding the power handling capability of the hybrid combiner and notes that Connecticut has not challenged the results of Sprint's isolation tests.<sup>68</sup> Furthermore, the TA Mediator finds some of the concerns raised by Connecticut regarding the interference potential of the hybrid combiner so "non-specific" that Sprint would be required to make "assumptions concerning their meaning."<sup>69</sup> Nonetheless, the TA Mediator recommends that Sprint be required to "identify remediation measures" that it would be prepared to take in the event that any of the risks identified by Connecticut arise during the transition period.<sup>70</sup>

24. *Decision.* We agree with the TA Mediator that Sprint has demonstrated that the hybrid combiners it is offering to loan Connecticut for the back-to-back system will protect Connecticut's communications from disruption during the transition to rebanded frequencies. We find persuasive the calculations Sprint performed regarding the power budget (insertion loss)<sup>71</sup> and the tests it performed regarding the isolation of the hybrid combiner.<sup>72</sup> Furthermore, we see no reason to question the manufacturer's specifications for the power handling capability of the hybrid combiner.<sup>73</sup> Consequently, we believe Sprint has demonstrated that the combiner it is offering to loan Connecticut is capable of providing Connecticut with backward compatibility for its mutual aid system during the rebanding process.

25. We recognize the difficult RF environment in which Connecticut must operate its mutual aid system, but find that Connecticut has not established that mitigating intermodulation interference requires the use of the more frequency-selective autotune combiners. We note that Connecticut's objection to hybrid combiners is specifically limited to hybrid combiners that lack a post filter. If an outboard bandpass filter is inserted between the antenna and the hybrid combiner, unwanted signals from collocated or nearby commercial repeaters would be prevented from entering the hybrid combiner and causing intermodulation products to develop in the non-linear elements of the repeater system. The inclusion of the outboard bandpass filter would satisfy the Commission's Minimum Cost Standard

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<sup>63</sup> *Id.* at 20; Attachment I at ¶ 24.

<sup>64</sup> *Id.* at 20; Attachment I at ¶ 26.

<sup>65</sup> *Id.* at 20; Attachment I at ¶ 27.

<sup>66</sup> TA RR at 16.

<sup>67</sup> *Id.* at 16-17.

<sup>68</sup> *Id.* at 17.

<sup>69</sup> *Id.*

<sup>70</sup> *Id.* at 17-18.

<sup>71</sup> Sprint PRM at 8-10.

<sup>72</sup> *Id.* at 12-13.

<sup>73</sup> *Id.* at 11; Appendix 2.



because it would provide Connecticut the interference protection it seeks, but at a significantly lower cost than requiring autotune combiners at each site in the temporary back-to-back network.<sup>74</sup>

26. Consequently, we require Sprint to provide an outboard bandpass filter at any site where intermodulation interference is encountered in the initial testing of the back-to-back repeater or subsequently. If there is more than a *de minimis* reduction in system Effective Radiated Power (ERP) as a result of the insertion loss of the filter, Sprint shall overcome such reduction by, *e.g.*, furnishing a higher gain transmitting antenna.<sup>75</sup> In the event that intermodulation interference continues to exist, or if there is more than a *de minimis* reduction in ERP, Sprint must loan Connecticut an autotune cavity combiner.<sup>76</sup>

## 2. Coverage Testing

27. The Parties dispute the time and associated cost of verifying proper functioning of the back-to-back system.<sup>77</sup> They agree that the coverage of the back-to-back system should be comparable to Connecticut's existing mutual aid system.<sup>78</sup> The Parties also agree that the TA's "Method 2" testing is appropriate for verifying coverage because new, and lower,<sup>79</sup> antennas will be deployed for the back-to-back system,<sup>80</sup> but they disagree on the time and cost needed to complete the Method 2 measurements.<sup>81</sup> Connecticut seeks eight hours of coverage testing per site for each of two readings (baseline and final) for a total of 16 hours per site at a total cost of \$121,600. Sprint contends four hours per site is adequate at a total cost of \$30,400.<sup>82</sup>

28. *Connecticut's Position.* Connecticut notes that Method 2 testing requires the recording of measurements at eight locations around each repeater site and explains that setting up a tripod to obtain readings will be necessary at each test point.<sup>83</sup> Connecticut's proposal provides for one hour per measurement location, including setup time for erecting a temporary mast antenna, running of all cables, configuring test equipment, performing measurements, breaking down the equipment and driving to the next measurement location.<sup>84</sup> Connecticut proposes that, at each measurement location, three measurements will be taken at different times and averaged to reduce the possibility of variations caused by temporary local interference.<sup>85</sup>

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<sup>74</sup> See *supra* n.14.

<sup>75</sup> Sprint notes that the inclusion of a higher gain antenna could be used to overcome any loss in transmitting power. See Sprint PRM at n.15.

<sup>76</sup> We note that any licensee causing or contributing to unacceptable interference to a non-cellular licensee in the 800 MHz band is strictly accountable for abating such interference. 47 C.F.R. § 90.673.

<sup>77</sup> TA RR at 4.

<sup>78</sup> Sprint PRM at 16.

<sup>79</sup> The temporary antennas for the back-to-back system are to be installed twenty feet below the existing antennas to avoid coupling. Sprint Reply at 13.

<sup>80</sup> TA RR at 18. Method 2 coverage testing involves a series of static line-of-sight measurements made before and after the installation of new antennas to verify comparability of the new antenna pattern. Typically, measurements are made at eight locations evenly spaced around a site. See 800 MHz TA Coverage Testing Fact Sheet at [http://www.800ta.org/content/resources/Coverage\\_Testing\\_Fact\\_Sheet.pdf](http://www.800ta.org/content/resources/Coverage_Testing_Fact_Sheet.pdf).

<sup>81</sup> TA RR at 18.

<sup>82</sup> *Id.*

<sup>83</sup> Connecticut PRM at 25-26.

<sup>84</sup> *Id.* at 26 and Attachment 4.

<sup>85</sup> *Id.* at 25.



29. *Sprint Position.* Sprint argues that the coverage measurement costs requested by Connecticut are unusually high and unjustified by any particular needs specific to Connecticut's system.<sup>86</sup> In particular, Sprint objects to that fact that Connecticut seeks to record measurement samples "over a longer period of time" in order to yield more accurate test results.<sup>87</sup> Sprint claims that its four-hour per repeater site proposal is consistent with Method 2.<sup>88</sup> It objects to Connecticut's proposal to divide the coverage testing area into grids,<sup>89</sup> claiming that grid-based coverage analysis is more appropriate to the more costly Method 3 drive testing than to the Method 2 testing necessary to verify the proper functioning of the back-to-back system.<sup>90</sup>

30. Finally, Sprint objects to Connecticut including the costs for any "sweep" measurements of the temporary antennas for the back-to-back system as part of coverage testing.<sup>91</sup> Sprint acknowledges that "sweeping" antenna systems is useful to verify their performance but states that such "sweeps" are typically performed by a technician at the time of installation.<sup>92</sup> Thus, Sprint objects to paying for an additional "sweep" during coverage testing.<sup>93</sup>

31. *TA Mediator.* The TA Mediator believes that Connecticut has met its burden of proof in demonstrating that its proposed coverage testing is consistent with the Minimum Cost Standard, except for the "sweeping" of antennas.<sup>94</sup> The TA Mediator notes that Connecticut's testing costs fall in the 99<sup>th</sup> percentile of the TA Metrics for both baseline and acceptance testing but observes that these costs include coverage measurements for all three components of Connecticut's system, *i.e.*, the trunked system, and the mutual aid simulcast and conventional system.<sup>95</sup> The TA Mediator also notes that Sprint's counteroffer—reflecting a greater than 75 percent reduction in the cost of coverage testing for the mutual aid system—still falls in the 98<sup>th</sup> percentile for baseline measurements and 94<sup>th</sup> percentile for acceptance measurements.<sup>96</sup>

32. Despite the overall high costs of Connecticut's rebanding, the TA Mediator believes Connecticut has demonstrated that Connecticut's coverage testing costs are reasonable.<sup>97</sup> The TA Mediator finds it persuasive that Connecticut's proposal is based upon the actual time spent by Motorola personnel performing "dry runs" of the measurement procedures.<sup>98</sup> Furthermore, the TA Mediator notes that allowing Connecticut to take three readings at each measurement location will provide a better quality assessment than taking a single sample.<sup>99</sup> The TA Mediator considers a better quality assessment important because the design of the back-to-back system will be different than that of Connecticut's

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<sup>86</sup> Sprint PRM at 15-16.

<sup>87</sup> *Id.* at 18.

<sup>88</sup> *Id.* at 17-18.

<sup>89</sup> Sprint Reply at 21-23.

<sup>90</sup> *Id.*

<sup>91</sup> Sprint PRM at 19. "Sweeping" an antenna involves measuring its return loss over a band of frequencies corresponding to those of interest. Return loss is a measure of antenna efficiency over a given bandwidth.

<sup>92</sup> *Id.*

<sup>93</sup> *Id.*

<sup>94</sup> TA RR at 19-20.

<sup>95</sup> *Id.*

<sup>96</sup> *Id.* at 20.

<sup>97</sup> *Id.*

<sup>98</sup> *Id.*

<sup>99</sup> *Id.* at 20-21.

permanent infrastructure.<sup>100</sup> Consequently, the TA Mediator concludes that expanded sampling during the testing process is warranted.<sup>101</sup>

33. The TA Mediator, however, recommends that Connecticut's costs for coverage testing be reduced by any amounts included for antenna "sweeps."<sup>102</sup> The TA Mediator believes that Connecticut has offered no compelling justification for a second "sweep" as part of the coverage testing.<sup>103</sup>

34. *Decision.* We agree with the TA Mediator that Connecticut has met its burden of proof in seeking 16 hours of coverage testing per repeater site at a total cost of \$121,600, provided all costs for antenna "sweeps" are removed. Connecticut's proposal allows one hour for recording measurements at each measurement location. As does the TA Mediator, we find that the tasks involved – equipment setup, calibration, measurement, equipment breakdown, and travel to the next site<sup>104</sup> – make Connecticut's estimate reasonable, notably because it is substantiated by the "dry runs" conducted by Motorola.<sup>105</sup> By comparison, Sprint's counteroffer of two hours per repeater location for each of two sets of measurements is unsupported and unrealistic<sup>106</sup> – it would allow Motorola personnel only fifteen minutes per measurement location to perform the described tasks.

35. We recognize that Connecticut's coverage testing costs are relatively high for a system with 5,388 subscriber units.<sup>107</sup> Nonetheless, we believe these costs are driven primarily by the large number of base stations (39) involved and because Method 2 testing calls for recording measurements at eight test points around each base station for a total of 312 measurement locations. We are not persuaded by Sprint's argument that three sets of measurements at each measurement location are excessive. Sprint does not deny that the additional measurements would improve overall accuracy of the process and, in any event, the total time actually spent recording measurements at each measurement site amounts to approximately ten minutes.<sup>108</sup> Any consequent savings by reducing the number of samples from three to one would be *de minimis*. Finally, we reject Sprint's argument that Connecticut has proposed a form of grid-based drive testing<sup>109</sup> – Connecticut's proposal clearly rests on Method 2 guidelines.

### 3. Site Documentation

36. The Parties disagree on the cost required to document changes made to Connecticut's system during the rebanding process.<sup>110</sup> Connecticut seeks \$83,606 to update documentation at each of

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<sup>100</sup> The TA Mediator notes that: 1) the antennas for the back-to-back repeater system will be positioned 20 feet lower on the tower than Connecticut's existing antennas, and 2) hybrid combiners will be deployed in lieu of autotune combiners assuming the Commission accepts the TA Mediator's recommendation on the previous issue. *Id.* at 21.

<sup>101</sup> *Id.*

<sup>102</sup> *Id.*

<sup>103</sup> *Id.*

<sup>104</sup> Connecticut PRM at 26.

<sup>105</sup> *Id.* at Attachment 4.

<sup>106</sup> Sprint PRM at 18.

<sup>107</sup> TA RR at n.51.

<sup>108</sup> Connecticut PRM at Attachment 4.

<sup>109</sup> Sprint PRM at 22-23.

<sup>110</sup> TA RR at 22.

the fifty-five sites throughout its entire network (including the voice, data and mutual aid systems) equating to eight hours per site.<sup>111</sup> Sprint offers \$41,800 for site documentation.<sup>112</sup>

37. *Connecticut's Position.* Connecticut states that, once the network is rebanded, all site documentation must be updated to reflect the post-rebanding configuration.<sup>113</sup> It contends that the updating is necessary to replicate the documentation associated with its present system.<sup>114</sup> It describes the following tasks for each base station site:

- examine all hard copy documentation
- prepare Computer Aided Design (CAD) schematics
- analyze licensed frequencies, and
- revise the equipment inventory.<sup>115</sup>

38. *Sprint's Position.* Sprint concedes that rebanding Connecticut's system is "extensive and complex," but submits that the actual changes made to each base station site at the end of the rebanding process are very limited.<sup>116</sup> It contends there is no obvious reason why frequencies need to be "analyzed,"<sup>117</sup> because a frequency analysis should have been completed during the planning phase – the documentation need only be updated to reflect the post-rebanding frequencies.<sup>118</sup> It contends that a complete revised inventory of equipment is unnecessary because only a limited amount of different equipment will be deployed during rebanding. For instance, Sprint notes that because the same make and model of equipment will likely be deployed at each mutual aid site for the back-to-back system, the warranty and manufacturer information will be the same for each site.<sup>119</sup> Summarizing, Sprint concludes that spending a "full workday" to update documentation at each site is "excessive and unreasonable."<sup>120</sup>

39. *TA Mediator.* The TA Mediator believes Connecticut has failed to meet its burden of proof on the issue of documentation, inventory, frequency analysis, schematics, etc., and recommends to the Commission that Sprint's offer of \$41,800 be deemed acceptable.<sup>121</sup> The TA Mediator agrees with Sprint that the work proposed by Connecticut appears to be excessive and in some cases inappropriate to the documentation process.<sup>122</sup> For instance, the TA Mediator notes that certain tasks such as analyzing the licensing paperwork at each site and independently checking it against the Commission's licensing database will be performed using funds allocated for licensing changes<sup>123</sup> at the end of the rebanding process.<sup>124</sup> Further, the TA Mediator finds that updating inventory will be made simpler because most of the temporary equipment loaned to Connecticut by Sprint for the back-to-back repeater system will be of

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<sup>111</sup> *Id.*

<sup>112</sup> *Id.*

<sup>113</sup> Connecticut PRM at 33.

<sup>114</sup> Connecticut SOP at 15.

<sup>115</sup> Connecticut PRM at Attachment 5.

<sup>116</sup> Sprint Reply at 26.

<sup>117</sup> *Id.*

<sup>118</sup> *Id.*

<sup>119</sup> *Id.* at 27.

<sup>120</sup> *Id.* at 28.

<sup>121</sup> TA RR at 24.

<sup>122</sup> *Id.* at 23.

<sup>123</sup> *See infra* ¶ 42.

<sup>124</sup> TA RR at 23.

the same make and model at each site. Finally, the TA Mediator finds the Commission's recent *Charles County* decision apposite to the extent it holds that new documentation for a temporary overlay system is unnecessary.<sup>125</sup>

40. *Decision.* We find nothing in the record establishing that the post-rebanding configuration of Connecticut's network will be so substantially different from its existing configuration as to require eight hours of documentation effort for each site.<sup>126</sup> Moreover, we expect that any required inventory of the equipment loaned to Connecticut by Sprint for the temporary back-to-back repeater system should be uncomplicated and limited in scope since the same equipment will likely be deployed at each site.<sup>127</sup> It is unclear whether Connecticut proposes to create additional documentation, *e.g.*, CAD schematics, for the equipment deployed in the temporary back-to-back repeater system or whether it proposes only to inventory such equipment. To the extent that Connecticut's proposal calls for new, rather than updated, documentation such as CAD schematics, we agree with the TA Mediator that the *Charles County* order establishes that such new documentation is unnecessary.<sup>128</sup>

41. Finally, we agree with the TA Mediator that some of the tasks proposed by Connecticut, such as cross-checking internal records with the Commission's licensing database, are more appropriate using funds allocated for the post-rebanding licensing process.<sup>129</sup> Consequently, based on the record before us, we conclude that Sprint's offer to provide Connecticut with \$41,800 to update its site documentation after rebanding is sufficient.

#### 4. Legal and Licensing Costs

42. The Parties disagree about legal fees and licensing expenses.<sup>130</sup> Connecticut seeks \$79,078 for legal costs (internal staff and outside counsel) and the cost of labor to make license changes (internal staff and Motorola personnel).<sup>131</sup> Connecticut's request equates to 250 hours for its internal legal counsel (\$17,773), 194 hours for outside counsel (\$49,900), 60 hours for internal staff to perform licensing modifications (\$4,265) and 60 hours for Motorola assistance with the licensing effort (\$7,140).<sup>132</sup> Sprint offers \$40,091 to cover these tasks.<sup>133</sup> The amount requested by Connecticut for legal and licensing costs falls at the 86<sup>th</sup> percentile of the TA cost metrics for this category.<sup>134</sup>

43. *Connecticut's Position.* Connecticut states that any complex agreement, such as the FRA, must be reviewed and approved by its internal counsel.<sup>135</sup> It also contends that its internal legal staff was

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<sup>125</sup> *Id.* In the *Charles County* decision, the Commission concluded that a newly drafted set of drawings were unnecessary for a three year temporary overlay system. See County of Charles, Maryland and Sprint Nextel Corporation, *Memorandum Opinion and Order*, 24 FCC Rcd 12749, 12756 at ¶ 24 (2009) *application for review pending (Charles County)*.

<sup>126</sup> At the conclusion of rebanding, the configuration of Connecticut's mutual aid system will remain unchanged. It will continue to use its existing infrastructure (repeaters, combiners and antennas) operating on channels fifteen megahertz lower in frequency.

<sup>127</sup> Sprint Reply at 27.

<sup>128</sup> See *supra* note 125.

<sup>129</sup> TA RR at 23.

<sup>130</sup> *Id.* at 24.

<sup>131</sup> *Id.* at 24-25.

<sup>132</sup> *Id.*

<sup>133</sup> *Id.* at 25.

<sup>134</sup> *Id.* at 26.

<sup>135</sup> Connecticut PRM at 37.

integral to the preparation and negotiation of its rebanding proposal and was needed to ensure compliance with ethics codes and labor practices.<sup>136</sup> Connecticut also states that it will perform, internally, the license modification applications for its sixty-five call signs.<sup>137</sup> It contends that each license modification will require the inputting of new frequencies, the removal of legacy frequencies and completion of construction notification.<sup>138</sup>

44. *Sprint's Position.* Sprint challenges primarily the costs attributable to Connecticut's outside counsel.<sup>139</sup> Sprint characterizes as "remarkable" the fact that outside counsel spent 114 of the requested 194 hours to negotiate the FRA, prepare Connecticut's internal cost estimate and coordinate approvals within Connecticut's internal agencies.<sup>140</sup> Further, Sprint questions whether it was necessary to have outside counsel assist Connecticut in developing its internal cost estimate.<sup>141</sup> Consequently, Sprint submits that 40 hours of legal services would have been adequate.<sup>142</sup>

45. Sprint also challenges Connecticut's request for 250 hours of internal legal time.<sup>143</sup> It states that Connecticut's internal legal costs appear to include "significant duplication of effort" and seem excessive when considered "on top of 194 hours for external legal counsel."<sup>144</sup> Sprint submits that 175 hours for internal legal costs would have been adequate.<sup>145</sup>

46. Finally, Sprint disputes the level of effort needed to update Connecticut's licenses following rebanding.<sup>146</sup> It contends that it should take no more than fifteen minutes per call sign to update the licensing records.<sup>147</sup> Sprint also believes that the hours requested by Connecticut for Motorola's staff appear to be "duplicative and unreasonable" for this task.<sup>148</sup>

47. *TA Mediator.* The TA Mediator recommends the Commission find Connecticut has met its burden of proof concerning the fees of internal and outside counsel, provided Connecticut presents itemized records demonstrating it seeks reimbursement only for work actually performed.<sup>149</sup> The TA Mediator notes that Sprint failed to point to any particular time entry it believes is unwarranted and, instead, has made only generalized comments about the total time expended. The TA Mediator believes records from Connecticut's internal legal staff describing the work it performed and the relevant dates will allow Sprint to identify any unwarranted duplication of effort.<sup>150</sup> As to licensing costs, the TA

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<sup>136</sup> *Id.* at 37-38.

<sup>137</sup> *Id.* at 35.

<sup>138</sup> *Id.*

<sup>139</sup> Sprint PRM at 20.

<sup>140</sup> *Id.* at 20-21.

<sup>141</sup> Sprint believes the development of an internal cost estimate is a task more appropriately described as project management and should be compensated at a project management rate rather than as legal hours. *Id.* at 21; Sprint Reply at 28.

<sup>142</sup> Sprint PRM at 21.

<sup>143</sup> *Id.* at 21-22; Sprint Reply at 28-29.

<sup>144</sup> *Id.*

<sup>145</sup> Sprint PRM at 22.

<sup>146</sup> *Id.*

<sup>147</sup> *Id.*

<sup>148</sup> *Id.*

<sup>149</sup> TA RR at 26.

<sup>150</sup> *Id.*

Mediator finds that the amount at issue, \$5,224, is *de minimis* in the context of a \$5.2 million reconfiguration and recommends the Commission award Connecticut the requested amount.<sup>151</sup>

48. *Decision.* We agree with the TA Mediator and will award Connecticut the entire \$79,078 it seeks for legal and licensing costs, subject to Connecticut producing itemized records for these tasks and being reimbursed only for documented, unduplicated, work performed. Connecticut has made its case for the legal costs it requests by explaining that the FRA negotiations were lengthy and that its internal staff was required to review the FRA to ensure compliance with various state laws.<sup>152</sup> We are not persuaded by Sprint's generalized objection that the amounts requested appear "excessive." We note, however, that we may have reached a different conclusion had Sprint been more specific, *e.g.*, by documenting unnecessary duplication of legal services. Furthermore, we also agree with the TA Mediator that Connecticut should receive its requested \$5,224 for post-rebanding licensing updates. Its estimate of the time required for the updates is credible given the number of tasks necessary for each license. Furthermore, we find Sprint's claim that no more than 15 minutes per call sign should be necessary for updates unsupported.<sup>153</sup> Nonetheless, as with its internal legal costs, Connecticut should produce itemized records for the work performed by its internal staff and seek reimbursement only for work actually performed to update its licenses.

#### IV. ORDERING CLAUSES

49. Accordingly, pursuant to the authority of Sections 0.191 and 0.392 of the Commission's rules, 47 C.F.R. §§ 0.191, 0.392; Section 4(i) of the Communications Act of 1934, as amended, 47 U.S.C. § 154(i), and Section 90.677 of the Commission's Rules, 47 C.F.R. § 90.677, IT IS ORDERED that the issues submitted by the Transition Administrator are resolved as discussed above.

50. IT IS FURTHER ORDERED that the Transition Administrator shall convene a meeting of the Parties within seven business days of the date of this *Memorandum Opinion and Order* for the purpose of concluding a Frequency Reconfiguration Agreement consistent with the resolution of issues set forth herein.

51. This action is taken under delegated authority pursuant to Sections 0.191 and 0.392 of the Commission's rules, 47 C.F.R. §§ 0.191, 0.392.

FEDERAL COMMUNICATIONS COMMISSION

Michael J. Wilhelm  
Deputy Chief - Policy Division  
Public Safety and Homeland Security Bureau

<sup>151</sup> Connecticut requests \$11,405 for licensing costs while Sprint offers \$6,181. *Id.*

<sup>152</sup> Connecticut PRM at 38.

<sup>153</sup> TA RR at 26.